17-21 September 2018,

Le Corum, Montpellier - France

Eucalyptus 2018

Managing *Eucalyptus* plantations under global changes

Abstracts Book

Variability of physicochemical properties of Eucalyptus robusta coppice wood according to environmental conditions and silvicultural practices in Madagascar

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In Madagascar, wood from eucalypts plantations is widely used to meet household energy needs and as an alternative to wood from natural forests. *Eucalyptus robusta* is the most planted species, and grows in various ecological conditions. Plantations are mainly managed in coppice. During the last two decades, the rotation time has been decreasing from 7 to 2 years due to growing demand. Although the growth of these coppices has been well studied, the properties of their wood have been poorly studied. This study investigates the effect of the environmental conditions and silvicultural practices on the physical and chemical properties of *E. robusta* coppice wood. One hundred and thirty-five trees, from 2 to 10 years old, were harvested from 5 regions of the Malagasy highlands. Three sites per region were sampled; they are characterized by an altitude ranging from 921 m to 1440 m, mean annual temperature from 17.6∘C to 20.1∘C, mean annual precipitation from 945 mm to 1545 mm and various soil properties. Wood density at 12% moisture content was measured using X-ray densitometry and chemical properties were predicted by Near Infrared Spectrometry (NIRS) models. Results show that tree age has an effect on both wood density and chemical properties. Wood density, extractives and Klason lignin contents increase with age, while holocellulose content decreases with age. Climate and some soil chemicals properties effects are significant for wood density. Wood density is higher in warm and dry regions with high soil pH. Wood density is lower in cold regions, on soil with high carbon and nitrogen contents. There is no evidence of the effect of plantation spacing and altitude of plantation site on the wood physicochemical properties. Optimal tree cutting age is proposed taking account of tree growth and wood properties. These results will help decisions makers for a more efficient management of *Eucalyptus robusta* coppice plantations in Madagascar and for a sustainable wood production.

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Keywords: Eucalyptus robusta, climate, coppice, rotation, soil, wood properties